USACHPPM
Readiness thru Health

18-023-0305
March 2005

# Just the Facts...

# St. Louis Encephalitis

- St. Louis encephalitis is a serious viral disease that is spread by infected mosquitoes.
- St. Louis encephalitis is one of several mosquito-borne virus diseases that can affect the central nervous system and cause severe complications and death.
- St. Louis encephalitis is found throughout the United States.
- There is no specific treatment for St. Louis encephalitis, only supportive care.
- Prevention centers on controlling mosquitoes and avoiding mosquito bites.

**What is St. Louis encephalitis?**
St. Louis encephalitis is a major mosquito-borne disease in the United States. It is one of a group of mosquito-borne virus diseases that can affect the central nervous system and cause severe complications and even death. Other similar diseases include eastern equine encephalitis, western equine encephalitis, and LaCrosse encephalitis.

**What is the infectious agent that causes St. Louis encephalitis?**
St. Louis encephalitis is caused by the St. Louis encephalitis virus, an arbovirus. Arbovirus is short for **ar**thropod-**bo**rne-**virus**. Arboviruses are a large group of viruses that are spread by certain invertebrate animals (arthropods), most commonly blood-sucking insects. In the United States, arboviruses are spread mainly by infected mosquitoes. Birds are often the source of infection for mosquitoes, which can then sometimes transmit the infection to animals and, in rare cases, people.

**Where is St. Louis encephalitis found?**
St. Louis encephalitis is found throughout North, Central, and South America, and the Caribbean, but is a major public health problem mainly in the United States. The virus is found throughout the country, but periodic outbreaks and epidemics have occurred in the Mississippi Valley and Gulf coast, the western states, and Florida.

**How do people get St. Louis encephalitis?**
The St. Louis encephalitis virus has a complex life cycle involving common birds (sparrows, finches, blue jays, robins, doves, etc.) and specific types of *Culex* mosquitoes that feed mainly on birds. Humans and other mammals are not an important part of the life cycle of the virus. Sometimes, however, people who live in or visit an area where the virus lives can be infected by the bite of an infected mosquito. After infection, the virus can then invade the central nervous system, including the spinal cord and brain.


Marin Sonoma Mosquito & Vector Control District

*Culex pipiens*, one of several *Culex* mosquito species that transmits the St. Louis encephalitis virus.

**What are the symptoms of St. Louis encephalitis?**
Symptoms of St. Louis encephalitis are usually mild and include fever, headache, tiredness, and dizziness. In its more severe form, the virus can cause inflammation of the brain which may result in convulsions and death. The case fatality rate is 3% to 30% (highest in elderly persons).

**How soon after exposure do symptoms of St. Louis encephalitis appear?**
It takes from 5 to 15 days after the bite of an infected mosquito to develop symptoms of St. Louis encephalitis.

**How is St. Louis encephalitis diagnosed?**
Diagnosis is based on tests of blood or spinal fluid.

**Who is at risk for St. Louis encephalitis?**
Anyone can get St. Louis encephalitis, but some people are at increased risk of more severe disease:

- Elderly persons;
- Persons living in crowded, low-income areas;
- People who work outside or participate in outdoor recreational activities in areas where the disease is common.

**What is the treatment for St. Louis encephalitis?**
There is no specific treatment for St. Louis encephalitis. Antibiotics are not effective against viruses, and no effective anti-viral drugs have been developed. Intensive supportive therapy to help relieve symptoms and prevent complications is very important.

**How common is St. Louis encephalitis?**
St. Louis encephalitis is the most common human disease caused by mosquitoes in the United States. From 1964-1998, there were 4,478 cases of St. Louis encephalitis, with over 2,500 cases reported during a major epidemic that occurred 35 states in the Midwest from 1974-1977. More recently, an average of 128 cases are reported annually. Many more infections likely occur without symptoms and therefore go undiagnosed.

*U.S. Army Center for Health Promotion and Preventive Medicine*
*Entomological Sciences Program*
*5158 Blackhawk Road, Aberdeen Proving Ground, Maryland 21010-5403*
*http://chppm-www.apgea.army.mil*

**Is St. Louis encephalitis an emerging infectious disease?**
Yes. St. Louis encephalitis virus was first isolated in 1933 in St. Louis, Missouri, and it has frequently re-emerged in outbreaks (usually <30 cases per outbreak) throughout the United States since that time. The risk of exposure has been increasing in urban areas as deteriorating inner cities create new habitats for mosquitoes.

**How can St. Louis encephalitis be prevented?**
There is no vaccine to prevent St. Louis encephalitis. Prevention centers on public health action to control mosquitoes and on individual action to avoid mosquito bites. To avoid being bitten by the mosquitoes which transmit St. Louis encephalitis virus:

- When outdoors during times that mosquitoes are biting, wear long-sleeved shirts and long pants.

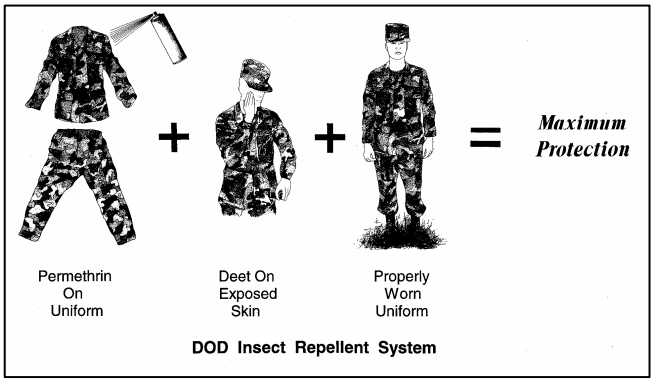
- Use mosquito repellents on skin and clothing.
- Use insect repellents that have been approved by the Environmental Protection Agency (EPA). They are safe and effective.

- For your skin, use a product that contains 20-50% **DEET** (N, N-diethyl-meta-toluamide). DEET in higher concentrations is no more effective.
- Use DEET sparingly on children, and don't apply to their hands, which they often place in their mouths.
- Apply DEET lightly and evenly to exposed skin; do not use underneath clothing. Avoid contact with eyes, lips, and broken or irritated skin.
- To apply to your face, first dispense a small amount of DEET onto your hands and then carefully spread a thin layer.
- Wash DEET off when exposure to mosquitoes ceases.

- For your clothing, use an insect repellent spray to help prevent bites through the fabric. Use a product that contains permethrin. Permethrin is available commercially as 0.5% spray formulations. In addition, factory permethrin-impregnated clothing is now available.
- Permethrin will withstand numerous launderings.
- Permethrin should only be used on clothing, never on skin.

- When using any insect repellent, always FOLLOW LABEL DIRECTIONS.
- Do not inhale aerosol formulations.

- For optimum protection, soldiers should utilize the **DOD INSECT REPELLENT SYSTEM**. In addition to proper wear of the battle dress uniform (BDUs), which provides a physical barrier to insects, this system includes the concurrent use of both skin and clothing repellents:
    - Standard military skin repellent: 33% DEET lotion, long-acting formulation, one application lasts up to 12 hours, **NSN 6840-01-284-3982**.
    - Standard military clothing repellents, either aerosol spray, 0.5% permethrin, one application lasts through 5-6 washes, **NSN 6840-01-278-1336**; or impregnation kit, 40% permethrin, one application lasts the life of the uniform (at least 50 washes), **NSN 6840-01-345-0237**.
    - Since mosquitoes can bite through fabric, particularly if it is pulled taut against the skin, it is especially important to treat the uniform fabric with permethrin.




**Where can I get more information on St. Louis encephalitis and other forms of mosquito-borne viral encephalitis?**
Contact the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), Aberdeen Proving Ground, Maryland 21010-5403; DSN 584-3613; CM (410) 436-3613; FAX -2037; or visit our website at: http://chppm-www.apgea.army.mil. Additional information can also be obtained from your local, county or state health departments, your health care provider or by visiting the website of the Centers for Disease Control and Prevention (CDC): http://www.cdc.gov/ncidod/dvbid/index.htm

---

Much of the information on St. Louis Encephalitis that is contained in this fact sheet was obtained from the Directors of Health Promotion and Education (DHPE). The information in this fact sheet is intended as guidance only and is not meant to be used for self-diagnosis or as a substitute for consultation with a health care provider.